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Study and Analysis of Complications Connected with Implant Placement

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ABSTRACT



Implant dentistry has grown to be one of the topmost earning disciplines of dentistry, and hence there is a migration of practitioners towards it. Since the last few years, here is a sudden growth in the number of dental inserts placed per year. And hence many complications that are associated with implant dentistry are on the rise. This article concentrates on some of the complications that are associated with implant placement during the operative procedure and immediate postoperative time period. Delayed complications as failure to osseointegrate and Peri Implantitis is not discussed in this article. A proper informed consent needs to be documented. It is absolutely necessary to include complications like bleeding, swelling, post-operative infection, facial discoloration, paraesthesia, hypersensitivity, loose teeth, trismus and pain. And major complications can be defined as a complication that may need additional treatments and can cause irreversible damages. Treatment of sinusitis incorporates foundational treatment with anti-toxins, chlorhexidine mouthwashes, water systems with saline through the nasal opening, and the utilization of nasal decongestants. In the event that the disease exacerbates or an ousted embed is in the sinus, revolutionary correction medical procedure of the maxillary sinus will be required and the antral mucosa totally eliminated.

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INTRODUCTION

Researches have confirmed that dental caries and periodontal infections are common explanations for tooth loss. Understanding this pattern will help to

determine the quality of treatment that needs to be provided (Misch and Wang, 2008). As dental awareness has risen, once the tooth is lost, the patient immediately thinks of replacing the missing tooth to restore the function and esthetics that were lost due to tooth extraction. Conventional replacement options are a removable denture and bridge. Dental implants have grown to be an excellent choice for replacement of missing teeth because of its capability of restoring the function to near normal for patients with missing teeth. As with any surgical procedures, complications can arise at any time during the surgery and postoperatively (Goodacre et al., 2003). The complications can vary from simple pain and swelling to severe bleeding and nerve damage. Most of the time these complications arise due to inadequate treatment planning, incorrect manipula-

tion of dental implants, mishandling of soft tissues, carelessness to perform in sterile conditions, contamination of the implant and poor implant orientation (Kalpidis and Konstantinidis, 2005).

A minor complication can be defined as a complication that reverses itself and are without any irreversible damages, without much treatment.

An implant practitioner needs to be familiar with these complications so that he/she can inform the patients during the informed consent and also prepare himself to prevent these complications by meticulous preparation, and also diagnose early on and provide adequate treatment if the complication arises (Kraut, 1996).

Complications connected to dental implants during surgery

Bleeding — one of the minor complications if it can be controlled with compression, pressure, cautery, bone wax, bone cement, ligation of arteries. As with any surgical procedure, bleeding from the surgical site is considered as a normal minor complication. But if it is in excess and if it becomes difficult to control, then it is considered as a major complication (Friberg, 1996; Annibali et al., 2008). Bleeding related complication is about 24% as described by Goodacre et al. Potential reasons comprise incision of veins in soft tissue, osteotomy research, and lateral wall sinus lift events and perforation of the lingual cortical plate.

Swelling - Swelling is a common complication that can arise after any surgical procedure. It subsides by itself without much further treatment. It depends on the duration and extend of the surgical site. Surgery should be done as atraumatic as possible to reduce tissue damage. Lack of patient compliance can also lead to swelling. use of ice packs, pressure and tamponade, and cold fluid eating regimen can assist with lessening the expanding and ought to be encouraged to the patient after embed medical procedure (Worthington et al., 1987; Lauc and Kobler, 1998).

Disease - Infections are brought about by bacterial tainting during surgery. And more, emerge during the initial not many postoperative days and presents with expanding, exudate and agony. This can be forestalled by following the careful standards of asepsis. Other than a sterile activity territory and a perfect climate, and the aseptic convention joins sterilization of the perioral skin with arrangements containing povidone-iodine and liquor, sanitization of the oral mucosa with 0.2% chlorhexidine (which fundamentally diminishes the bacterial include in the spit for more than 4 hours), and purifying of

careful gloves in clean saline to eliminate residue or impurities (Wanner et al., 2013). Organization of anti-microbial treatment when the strategy and the remedy of legitimate oral cleanliness at home with mouthwashes containing 0.12% chlorhexidine during the initial fourteen days after the methodology.

Ecchymoses and haematomas - Blood emissions invading surface tissues (ecchymoses) and encompassed blood assortments (hematomas) are not basic after embed medical procedure (Quiney et al., 1990; Ueda and Kaneda, 1992). Absence of patient consistence with the directions vessel delicacy, particularly commonplace in older patients, and the inability to end antiplatelet treatment before the medical procedure is viewed as the contributing components. Ecchymoses and hematomas don't by, and large require specific treatment. Skin uses of heparin-containing meds will enable them to resorb. In the event that there is an ongoing hematoma between the bone and the mucoperiosteal fold, it ought to be depleted, and outer pressure will be applied on the delicate tissues to dodge backslides (Regev et al., 1995).

Maxillary Sinusitis — Bacterial pollution of the maxillary sinus can happen during medical procedure done under non-aseptic conditions (Lioubavina-Hack et al., 2006). Bacterial defilement can likewise happen during recuperating for wound dehiscence or in light of embed relocation into the sinus, causing an unfamiliar body response and ongoing contamination. Sinusitis may show as intense and afterwards become constant, if the causative factor isn't distinguished and eliminated, it might show as persistent from the beginning (Katranji et al., 2007). Intense sinusitis gives itself torment, oedema, growing, blushed delicate tissues overlying the included sinus and purulent waste through the homolateral nasal cavity. In ongoing cases, there are less exudates however has a gigantic multiplication of mucosa, thickening of the film and metaplasia of the epithelium; polypoid masses may somewhat fill the sinus prompting exudate maintenance (Tarnow et al., 2000). The air in the sinus will diminish extensively, and the antral substance will turn out to be dynamically radiopaque until it is totally and for all time opacified. Maxillary sinusitis might be forestalled via cautiously screening patients before embed medical procedure to recognize people with sinusitis or inclining factors, regulating prophylactic anti-toxin treatment and carefully watching the careful standards of asepsis (de Oliveira et al., 2006).

Nonattendance of essential strength - soundness of the embed is one of the most significant elements which embed mooring. Essential embed soundness

is the biomechanical solidness accomplished upon embed addition, it is impacted by various elements, for example, bone amount and quality, the strategy of the implant, surgical method, and insertion torque. Lack of treatment planning and implementation is the most common cause. Careful drilling, according to the bone quality and insertion of the implant can help in preventing this complication. The loose implant must be detached and substituted by a bigger diameter implant, if not done, it can result in a fibrous encapsulation rather than osseointegrate.

Dehiscence or fenestration - This complication also arises because of poor treatment planning and placement of implants. A minimum of 2mm buccal bone is needed in excess to prevent bone resorption. And a distance of 1.5mm from the adjacent tooth. Failure to evaluate the bone quantity, careless drilling, overheating bone and placing implants with high torque can be a few of the reasons that contribute to this.

Fenestration leaves flawless bone coronally and uncovered strings at the apical segment of the peak, and this is a direct result of the cortical plate fluctuates in thickness all through the mouth. While in dehiscence, the coronal segment of the embed is uncovered. This can be remedied with articulate bone uniting with or without a layer during the hour of embed arrangement (Juodzbaly *et al.*, 2013).

Improper placement - Improper implant placement can cause havoc during the prosthetic phase. It can lead to loss of esthetics and function. Implants should be placed in any event 1.5 mm nearby tooth and more than 3 to 4 mm between neighboring inserts to forestall level bone misfortune and save feel. Legitimate arranging by recording the interocclusal, interdental, edge stature and edge width will help forestall this confusion.

Tarnow *et al.* and Oliveria *et al.* in their investigations called attention to that if the separation between the prosthetic contact point and the crestal bone is 5 mm or less, at that point 98% of the time the embrasure space was filled in, yet as the separation is more than 6 and 7 mm, the presence of a papilla decreases to 56% and 27%. (Greenstein and Tarnow, 2006)

Wrong angulation - another operator error, poor treatment plan and execution. Wrong angulation leads to poor esthetics and biomechanical stability of the implant. Proper angulation should be determined before implant placement taking into consideration the future prosthesis and its orientation with the buccolingual, apical coronal, and mesiodistal positions (Baruchin *et al.*, 2003). Trying to place

the implant at the available bone area instead of its proper position is the main cause of this complication. A surgical stent can be used to prevent this complication. Also, the use of finger rests can lead to improper angulation.

Transient or everlasting nerve injury - inferior alveolar nerve and the lingual nerve are the common ones that can get affected. Implants placed to close to the nerve can cause this complication. It usually resolves once the hematoma surrounding the nerve bundle subsides.

But if the nerve bundle is damaged while drilling or during implant placement, then it becomes a major complication.

The effect of the injury can lead to mild paresthesia to complete anaesthesia.

Other possible reasons for nerve injury are helpless fold plan, horrible fold reflection, the entrance of the osteotomy, pressure of the embed into the channel, intraneural infusion, foothold of the psychological nerve in a raised fold.

Gary Greenstein and Dennis Tarnow in their writing, brought up that to stay away from mental nerve injury during a medical procedure. Rules created dependent on writing checking the situation of the psychological foramen and the presence of a foremost circle of the psychological nerve (Kraut and Chahal, 2002).

These rules state to leave a 2 mm zone of security between an embed and the coronal part of the nerve.

It is essential to watch the nerve in radiographs, and if that isn't clear, a CT examine should be done to know the specific area of the nerve and encompassing structures. Numerous treatment choices are referenced in writing like utilizing neuronal calming medications, for example, clonazepam, carbamazepine or nutrient B-complex. As per Kruat *et al.* reference for miniature neurosurgery ought to be done preceding the distal nerve degeneration occurs. Subsequent arrangements should happen at 4, 8, and 12 weeks after position and indications and capacities progress ought to be archived.

Harm to the teeth nearby the embed - This is a significant iatrogenic inconvenience wherein the contiguous teeth get harmed in light of ill-advised embed position. The influenced tooth may require apical curettage, root channel treatment, apicoectomy, or even abstraction.

Movement of implants into the maxillary sinus and sinus related complications - This can be associated with and without an oroantral communication. It is an uncommon complication but is possible

when placing implants in the posterior maxilla. Trying to place implants at the maxillary sinus region without proper elevation of the sinus membrane, high pneumatization, low density of posterior maxilla, request of heavy force through implant placement, surgical inexperience, excessive tapping during sinus osteotomy are the main causes of this complication. Implants in the sinus need to be detached to avoid further complications. Transantral endoscopic surgery, transnasal, transoral and conventional Caldwell Luc procedures are recommended for implant retrieval ([Hegedus and Diecidue, 2006](#)).

A referral to the ENT surgeon may be needed for the procedure. Large perforation of the sinus membrane caused by implant placement which was treated by using a pedicled buccal pad fat graft was reported by Kim et al.

Other implant displacement sites and injuries - Heat generation while osteotomy preparation is one of the issues that can happen in the mandible since it is typically contained thick bone. An uncommon instance of embed removal into the mandibular back zone of a 54-year-elderly person was accounted for by Doh et al. This was most likely incited by deficient bone thickness, loss of cortical bone commitment, and changes in bone quality between the alveolar bone and the basal bone. Migration of an implant dislodged in the maxillary sinus toward the sphenoid sinus is a unique case. This case was treated with endoscopy through the nasal cavity ([Sussman, 1998](#)).

Broken instruments and drills - This is another possible complication that can occur during implant surgery. Instrument fatigue and improper use is one of the common reasons for this. Caution while handling small components in the oral cavity is warranted. In the event that a patient swallows or suctioned an embed part, they ought to be alluded to the emergency clinic since intense block can be hazardous and dragging out the evacuation of unfamiliar items may make a bronchoscopy actually more troublesome. Deterrent estimates, for example, cloth throat screens and floss ligatures on embed pieces are supported.

Mandibular bone fracture - This is another uncommon or a rare complication that can occur when the implants were tried to be placed on the atrophic mandible. It is not an uncommon procedure to do so. A case was reported of a 77-year-old woman by Almasri et al.

Another possible cause can be because of trying to use excessive force for placing a higher diameter implant into a small diameter osteotomy. In patients by osteomalacia or osteoporosis, implant assign-

ment might focus the stiff bone to break since of the load or frictional forces. Mandibular fractures need to be stabilized immediately and should be surgically managed to prevent further complications like osteomyelitis, malunion, paraesthesia. To prevent fractures of the mandible, implants should not be placed into extremely atrophic mandibles, unless the opposing cortical is preserved, or it should be only done after alveolar augmentation. Transposition of the second rate alveolar nerve and position of inserts is one of the treatment options for patients with an edentulous back mandible and insufficient bone stature over the substandard alveolar trench. Potential complexities with this procedure can incorporate delayed neurosensory issues, disease, and pathologic break.

Hematoma in the floor of the mouth and serious dying - a few examinations have demonstrated this an unprecedented confusion that can happen during insert medical procedure. Sublingual hematoma can happen during the arrangement of mandibular dental inserts are potentially dangerous.

Upper aviation route hindrance, serious draining and arrangement of a hematoma in the floor of the mouth are the aftereffect of vascular injury. This vascular inconvenience is ascribed to undesirable holes in the lingual cortical plate now and again. An aviation route obstacle was additionally noted. Careful aptitudes and information on life systems is expected to forestall this sort of confusions.

Kind paroxysmal positional vertigo (BPPV)- This is an uncommon however not normally announced inconvenience that can present as an early postoperative difficulty. (BPPV) is the most pervasive sort of vertigo ([Kim, 2000](#)). It is initiated by free otoconia from the utricle which, in specific positions, uprooted the cupula of the back crescent trench. It is frequently an aftereffect of maturing. It likewise can occur after a hit to the head. More uncommon clarifications remember a long situating for the spine during some surgeries like the situating required during the maxillary dental embed arrangement, a constrained head situating and inward ear injury initiated by dental turbine clamor working in the maxillary bone.

Neuropathic torment - This is an uncommon entanglement that can happen if there is a minor hole of the mandibular channel during insert position.

Impermanent or persevering dysesthesia of the mediocre alveolar nerve has frequently been accounted for as a confusion of embed medical procedure of the mandible. Leckel et al. for their situation report expressed that a minor hole of the top of the mandibular channel during insert

position created discrete bothering of the nerve, bringing about constant neuropathic torment without attendant hypesthesia or dysesthesia.

Since the channel was not identified in ordinary dental radiographs, this circumstance made the correct finding befuddling and prompted undesirable surgeries, including extraction of nearby teeth. CT, at last, uncovered the closeness of the pinnacle of the embed and the hard structure of the mandibular channel. After the evacuation of the causative embed, the torment progressively blurred over a time of a year.

Recalcitrant osteomyelitis — An instance of extreme osteomyelitis following the situation of a dental embed into an extraction attachment of a 61-year-old person was depicted by Kesting et al. The patient created repetitive perimandibular abscesses and was treated with careful waste and high-portion intravenous anti-toxins. However, it prompted hard-headed osteomyelitis.

Hemimandibulectomy and fractional mandibular recreation with a free fibular fold was done at long last.

Plunging ranula - This is another intriguing case which was accounted for by Loney et al. and Mandel et al. A plunging ranula is a bodily fluid-filled hole in the floor of the mouth near the submandibular organ that happens when the liquid weight of the mucin analyzes through the hole in the mylohyoid muscle into the submandibular space. Loney presents an article in insight regarding a 44-year-old female that gave plunging ranula after the position of 2 inserts. After MRI and CT assessment, the patient went through careful extraction of the sublingual organ and the prevalent part of the ranulas sinewy case with no intricacies (Damlar, 2015). This happened on the grounds that the inserts were angulated excessively far lingually and situated excessively far buccally, which brought about the hole of the lingual cortex and slash of the sublingual organ, iatrogenically causing a plunging ranula. Utilizing more limited inserts and cautious arranging and rehearsing great careful methods can forestall these inconveniences.

Titanium extreme touchiness - An uncommon entanglement. A case was accounted for by Du Preez et al., where 6 titanium inserts were set in the mandible between the left and right mental foramen. The inserts were completely built with grade IV titanium. The patient built up a serious response to all the inserts, with both clinical and radiological highlights of confusion. The encompassing tissue response was extreme and justified the evacuation of the apparent multitude of inserts.

The encompassing delicate tissue was submitted for histological investigation, which uncovered a constant provocative reaction with associative fibrosis around all the inserts just as unfamiliar body monster cell response around two inserts. Following insert expulsion, the patient recovered well, and the delicate and hard tissue recuperated sufficiently.

CONCLUSIONS

Complications can arise in any surgical procedures. And when it arises, it should be dealt with immediately. Main causes for these complications are carelessness and poor treatment planning. Lack of proper training in the field of implant dentistry, lack of communication between the colleagues regarding the treatment plan and with the patient regarding postoperative instructions. Time should be dedicated for proper treatment planning and use appropriate tools like radiographs and CT scans if needed. The implant surgeon should constantly try to upgrade his skills in the field and should be competent to plan and execute a predictable surgery with little complications as possible. Each case has to be thought through, and the possible complications should be envisioned and discussed with the patient during informed consent.

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Conflict of interest

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